

REMARKS

Claim 1 has been amended in order to more particularly point out, and distinctly claim the subject matter to which the applicants regard as their invention. The applicants respectfully submit that no new matter has been added. It is believed that this Amendment is fully responsive to the Office Action dated September 30, 2003.

Claim Rejections under 35 USC §112

Claims 1-20 are rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, the Examiner asserts that claim 1 recites that the current blocking layer includes a first layer containing aluminum and boron and a second layer containing indium and having a smaller band gap than the first layer. The Examiner asserts that this is not supported by figure 1. The Examiner's grounds of rejection is respectfully traversed. Figure 2 shows a first current blocking layer (12a) and a second current blocking layer (12b) in which the band gap of the second current blocking layer (12b) is smaller than that of the first current blocking layer (12a). This is described in the specification on page 17, lines 12-18. This passage of the specification states;

“As understood from Fig. 2, the band gap of the n-first current blocking layers 12a is larger than that of the p-first cladding layer 11 and the p-second cladding layer 14. However, the band gap of the n-second current blocking layers 12b, which is smaller than that of the n-first current blocking layers 12a as well as those of the p-first cladding layer 11 and the p-second cladding layer 14, is larger than that of the

quantum well layers (energy level E1 on the lower end of the conduction band) forming the MQW active layer 8.” (Emphasis Added)

Further page 18, lines 1-13 of the specification states:

“In the semiconductor laser device according to this embodiment, the layers from the p-first cladding layer 11 to the p-second cladding layer 14, including the n-first current blocking layers 12a, are prepared by adding at least one of B and Al to GaN, and the total thickness of these layers is about 0.9 μm . However, the n-second current blocking layers 12b of n-BInGaN having a smaller band gap than the n-first current blocking layers 12a of n-BAlGaN are held between the n-first current blocking layers 12a for effectively absorbing strain caused in the n-first current blocking layers 12a arranged on both sides thereof, thereby preventing cracking. In particular, the n-second current blocking layers 12b containing indium attain a large anti-cracking effect.” (Emphasis Added)

Therefore based on figure 2 and the above descriptions in the specification the Examiner’s grounds of rejection is respectfully traversed.

Regarding claim 3, the Examiner asserts that the claimed feature of the first nitride based semiconductor layer further includes a second conductivity type cladding layer is not supported by figure 1 and the specification. Again the Examiner’s grounds of rejection is traversed since page 14, lines 2-11 of the specification states;

“A p-carrier blocking layer 9 of BAlGaN having a thickness of 200 \AA , a p-light guide layer 10 of BGaN having a thickness of 0.1 μm and a p-first cladding layer 11 of BAlGaN having a thickness of 0.2 μm are successively formed on the n-MQW active layer 8. An n-current blocking layer 12 of about 0.5 μm in thickness having a striped opening 13 is formed on the p-first cladding layer 11. A p-second cladding layer 14 of BAlGaN having a thickness of 0.7 μm is formed on the p-first cladding layer 11 located in the striped opening 13 and the n-current blocking layer 12.” (Emphasis Added)

Therefore, withdrawal of the rejection of Claims 1-20 under 35 USC §112, second paragraph, is respectfully requested.

Claim Rejections under 35 USC §102

Claim 1 is rejected under 35 USC §102(a) as being anticipated by prior art figure 12.

The present invention is a semiconductor laser device composed of multiple layers. The most significant layer is the current blocking layer that is composed of two distinct layers. The first layer is a nitride based semiconductor composed of at least one of aluminum or boron. The second layer is also nitride based and composed of indium. Most importantly, is that the second layer has a smaller band gap than the first layer.

The admitted prior art as shown in Figure 12 describes a structure similar to that shown in Figure 1. Specifically, a P type electrode (66) is provided on a contact layer (65) which is located on a second cladding layer (64) over a current blocking layer (62) having an opening (63) which is located on a first cladding layer (61).

However the admitted prior art as shown in Figure 12 does not describe the current blocking layer that is composed of two distinct layers. The first layer is a nitride based semiconductor composed of at least one of aluminum or boron. The second layer is also nitride based and composed of indium. Further, the second layer has a smaller band gap than the first layer. As previously discussed page 17, lines 12-18 and page 18, lines 1-13 of the specification provide support for these elements.

In the semiconductor laser device shown in the admitted prior art in FIG. 12, the current blocking layer (62) is composed of a single layer of n-GaN, not multiple layers. Also, the layer (61) is the first p-AlGaIn cladding layer, not the first layer of the current blocking layer.

Even if the layer (61) is the first layer of the current blocking layer, the second layer which is composed of a nitride semiconductor containing indium and has a smaller band gap than the first layer (61) does not exist in the semiconductor laser device of prior art Fig. 12.

In addition, the layer (64) is the second p-AlGaIn cladding layer, not the second layer which is composed of a nitride semiconductor containing indium and has a smaller band gap than the first layer (61).

Specifically, claim 1 patentably distinguished over the Admitted Prior Art by reciting,

“A semiconductor laser device comprising: a first nitride based semiconductor layer including a first conductivity type cladding layer and an active layer and containing at least one of boron, aluminum, gallium, indium and thallium; a current blocking layer, formed on said first nitride based semiconductor layer, having a striped opening; and a second nitride based semiconductor layer, formed on said first nitride based semiconductor layer in said striped opening, including a second conductivity type second cladding layer and containing at least one of boron, aluminum, gallium, indium and thallium, wherein said current blocking layer includes a multilayer structure of at least one first layer of a nitride based semiconductor containing at least one of aluminum and boron and at least one second layer of a nitride based semiconductor containing indium and having a smaller band gap than said first layer.” (Emphasis Added)

Therefore, withdrawal of the rejection of Claim 1 under 35 USC §102(a) as being anticipated by prior art figure 12 is respectfully requested.

Claim Rejections under 35 USC §103

Claims 2-20 are rejected under 35 USC §103(a) as being unpatentable over prior art figure 12.

Claims 2-20 are allowable by virtue of their dependence from an allowable independent claim. Therefore, withdrawal of the rejection of Claims 2-20 under 35 USC §103(a) as being unpatentable over prior art figure 12 is respectfully requested.

Conclusion

In view of the aforementioned amendments and accompanying remarks, claims 1-2 and 4-20, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

U.S. Patent Application Serial No. **09/532,775**
Amendment dated February 17, 2004
Reply to OA of **September 30, 2003**

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, KRATZ, QUINTOS,
HANSON & BROOKS, LLP



George N. Stevens
Attorney for Applicant
Reg. No. 36,938

GNS/alw
Atty. Docket No. **000352**
Suite 1000
1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930



23850

PATENT TRADEMARK OFFICE

H:\HOME\GSTEVEN\00\000352\02-04 Amend